DOCUMENT RESUME

ED 335 186 RC 018 268

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TITLE The Labor Market and Human Capital Investment.
PUB DATE Jul 91
NOTE 17p.; Paper presented at the Annual Meeting of the Rural Sociological Society (Columbus, OH, August 8-11, 1990).
PUB TYPE Reports - Research/Technical (143) -- Information Analyses (070) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Dropout Rate; *Economic Development; *Educational Attainment; High Schools; *Human Capital; *Labor Market; Poverty; *Rural Areas; Rural Education; Rural Urban Differences; Skilled Workers; Theories; Unemployment; Unskilled Workers
IDENTIFIERS *Human Capital Theory

ABSTRACT

This study tests the hypothesis that the local labor market structure, particularly the proportions of high- and low-paying occupations, affects human capital investment. Most studies have assumed that the direction of causation flows from the supply of human capital to employment growth. However, the creation of low-skilled jobs merely reshuffles people among unemployment lines, poverty, and low level employment. It does not improve the economic or social conditions of the community. Dependent variables in the study were the high school dropout rate and the percentage of graduates continuing their education. Independent variables include the percentage of county enrollment in occupations classified as managerial and services, the unemployment rate, the percentage of change in population, and a measure of rurality. Data from Virginia's counties and independent cities were used to estimate the human capital model. Important findings were: (1) the higher the percentage of employment in managerial occupations, the higher percentage of high school students who continue their education, and the lower the dropout rates; (2) dropout rates increase as the percentage of jobs in service occupations increase; and (3) as unemployment increases, the percentage of students who continue their education increases. The study concludes that the types, rather than the sheer number, of jobs available in the local area influence human capital investment as measured by education. Communities should actively recruit firms that have a higher percentage of workers who are rewarded for their education. (KS)

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ED335186

The Labor Market and Human Capital Investment

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Staff Paper 91-17 July 1991

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Introduction

Many of the poorest regions of rural America have not benefitted from the national growth which has occurred since the 1960s. Two hundred forty-two (10%) non-metropolitan counties are classified as persistently poor--they have ranked in the lowest 20% of counties in per capita income since 1950 (Bender et al. 1985). During the 1960s specific attention was focused on poverty areas in an attempt to raise their standard of living. Even some counties which had rapid job growth did not show a decrease in poverty (Larson and White 1986). Educational achievement was also low. By 1980 "[o]nly 41% of persistent poverty county residents aged 25 and over had completed high school" (Bender et al. 1985).

Thus the long-term impact of employment creation strategies in rural areas can be questioned. These strategies have been based on attracting jobs to the area with the measure of success being the number, not the quality or wage of the jobs. In addition, little attention has been given to the incentives created by the labor market for human capital investment. For example, the demand for highly skilled labor creates incentives for individuals (and communities through their school districts) to invest in human capital. The absence of demand for skilled labor may serve as a disincentive for individuals and communities to invest in human capital.

This paper will argue that the local labor market creates incentives for human capital investment, particularly education. The individual measures returns to human capital investment as increased income.

Human Capital Theory

An investment is made when the rate of return on the investment exceeds the rate of return on alternate uses of the capital (or other resource). Schultz (1961) suggested that human capital investment is a specific example of general investment behavior. Schultz defined investment in human capital as any expenditure in education, health or even internal migration that is aimed at taking advantage of better job opportunities. Becker (1962) stated that investment in human capital is any activity that improves ". . . the physical and mental abilities of people and thereby raises real income prospects."

Thus, the existence of better job opportunities creates incentives for human capital investment. Friedman and Kuznets (1945) implicitly recognized investment in human capital as a determinant of income and wealth. Like other investment decisions, if expected returns to human capital investment are higher than the costs incurred in the investment, then one would respond

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positively to that incentive by investing. The costs of the investment include the opportunity costs of investing the money in other ways and the income that is lost by attending school or training rather than working. If the costs exceed the returns, there is no incentive for investment and the individual would not invest.

Implicit in this perspective is the assumption that labor has perfect knowledge of job opportunities and is highly mobile. Persons have an incentive to obtain as much education as would optimize life-time earnings and migrate to a place where they can maximize their incomes. That is, the supply of human capital is independent of local demand and instead responds to the national labor market. If one can increase one's income by an amount which exceeds the cost of the move and the increased cost of living (in present value terms), then one will make the move. But individuals may not conform to this ideal market for two reasons. Values held by some individuals, particularly those related to family and community, may make such a move emotionally costly. In this case, the monetary gain from making a move--particularly a long distance one--must be substantial before it will be considered. In addition, rural people may lack information about job opportunities elsewhere. In these cases it is reasonable to expect that the individual responds to job opportunities in the local labor market.

Schultz (1961) indicated that returns to human capital investment are much higher than returns to investment in physical capital. In general, people with better education earn more money, hold better jobs and are less likely to be unemployed or poor (Killian and Parker, 1991). But not all of the returns to human capital investment go the individual. The public also receives returns to the investment in the form of capacity for technical change, improvement in medical knowledge, higher life expectancy, and economic mobility (Usher 1978, Sjaastad 1962, Welch 1978). When making an investment decision, the individual considers only her returns (increased income). In doing so she underestimates the total returns to the investment. This causes underinvestment in human capital which can result in economic retardation and underdevelopment (Becker 1960, Schultz 1961).

The public good aspect of human capital investment has led to a research emphasis on the impact of human capital investment on economic development. The literature on industrial location also assumes that economic development flows from human capital. Existing levels of labor skills are important determinants of the types of firms which will locate in an area (Killian and Parker, 1991).

The crucial role of human capital in the development process has dominated human capital investment literature and research. The possibilities of causation going in the reverse direction, or of the existence of a feedback loop, have to a large extent, been ignored. The existence of a feedback loop is suggested in a study by Rosenzweig (1988). Using data from U.S., Colombia, India, Malaysia, the Philippines, and models of household behavior, Rosenzweig concludes that population growth and human capital investment reflect the economic circumstances of a country. The observed mix of family size, levels of health, nutrition, and schooling are <u>symptoms</u> not <u>causes</u> of the economic development level. In another cross-national study, Nuss and Majka (1985) found that economic development level (as indicated by per capita GNP) to have a positive effect on female education.

This paper contends that, at the individual level, the human capital investment is "caused" by the existence of opportunities for better incomes given the required skills. An individual invests in human capital to take advantage of these opportunities to improve her income level. Because national job information does not flow freely, expectations about returns to human capital investment will be based mainly on the local labor market. Even with information on the larger labor market, the individual may find that the monetary benefits of a move do not outweigh the non-monetary costs of such a move.

Empirical Studies

Recent studies have indicated that the causal direction between levels of human capital and employment growth is not as clear as it was assumed to be in the past. Killian and Parker (1991) argue that raising average educational levels does not necessarily cause job growth in local economies. From 1969 to 1979, metropolitan areas with higher levels of average schooling grew faster than those with a lower average. But in the 1980s, average educational levels had little impact on job growth in metropolitan areas. Rather, there was a positive relation between the percent of college graduates and local employment growth and between dropout rates and local employment growth! Thus, variation in local industrial structure affects the demand for labor. Killian and Parker found no relation between job growth and education in non-metropolitan areas. Similar to Killian and Parker, John et al. (1988) found that the percent of the population with a high school education had no significant effect on employment growth rates from 1979 to 1984 in rural Midwestern counties.

Rudnicki and Deller (1989) provide an example of a positive relation between high quality stocks and flows of human capital and local economic growth in Maine. This study, using a sample of rural towns, covered a period of high in-migration. Seventy percent of these migrants were employed as professionals, executives, administrators or managers. It is therefore reasonable to assume that the positive correlation is due to the highly skilled migrants who improved educational levels at the top.

Killian and Parker (1991) point out that research results are sensitive to the definition of the local economy, the region of the country, the time period, and the methods used to estimate the relationships. While others have defined the local economy as the state or the county, Killian and Parker defined a local economy as a cluster of counties with commuting. Killian and Parker also found that the relationship is changing over time. Although educational levels do influence the location of firms, Killian and Parker could not establish the direction of causality between education and industry because of the relationship between education and other local characteristics such as the social and geographical setting. Simple correlations are likely to show a relationship between average education and employment growth. When other characteristics of the local economy are controlled for, there are little or no significant effects of average education (Killian and Parker, 1991). For example, De Young (1985) found a positive correlation between local investment in education and manufacturing, but when other factors were controlled this relationship became insignificant.

All of the above studies have assumed that the direction of causation flows from the supply of human capital to employment growth. McGranahan and

Ghelfi (forthcoming) conclude that lack of rural demand for highly skilled labor caused the wage differential between high and low skilled workers to increase more rapidly in urban than in rural areas during the 1980s. Lack of demand resulted in a "substantial out-migration of the better educated rural working age population" (McGranahan and Ghelfi, forthcoming). This is a clear example of the migration that Schultz defined as human capital. It also demonstrates that the individual does respond to labor market demand.

Studies in the economically depressed counties of Appalachia suggest that human capital investment decisions are greatly influenced by the level of economic development as indicated by employment rates, personal income and poverty levels and by the social atmosphere in the community (Smith 1988b, Flunkett and Bowman 1973, Collins 1979, and Bowles and Gintis 1976). They argue that character traits and aspirations are heavily influenced by the psychological climate created by management of the dominant local business which reflects its proprietary interests. They further point out that management interests may not always be progressive, especially if profitability depends upon low-skill immobile labor. Smith (1988b) further hypothesizes that companies which have a high proportion of trained labor have a stake in the education system and will push for better quality education. The opposite is true of companies that have a very small proportion of trained labor. Companies which rely on low-skill workers will not encourage employees to participate in community decisions and actions to increase the supply of educational services. They may even discourage improvement of the schools to avoid paying higher taxes and higher wages.

To alleviate the economically depressed conditions in Appalachia, manufacturing industries were actively recruited into the region. It was assumed that this would create jobs, raise income levels, stabilize income and thus reduce poverty in this region. Recent studies have found that manufacturing has not achieved these goals, and that human capital investment still lags far behind that of more prosperous regions. Larson and White (1986) found that as many people entered conditions of poverty as those who left, leaving poverty levels unchanged. The creation of new jobs through industrialization did not improve human capital investment because the manufacturing jobs created did not require high skills. These findings raise questions about past approaches to economic development and past assumptions about industrialization as a catalyst for economic development. Rather the creation of low-skilled jobs merely reshuffles people between unemployment lines, poverty, and low level employment, but does not in fact, improve the economic or social conditions of the community.

Smith (1988a) found that the industries in the Appalachian region of Kentucky have very low proportions of workers who are rewarded noticeably for having post-secondary educational qualifications. The replacement of mining jobs with manufacturing jobs resulted in approximately the same ratio of managerial, professional, and technical workers to production workers as previously (Smith 1988a). Smith hypothesized that without a change in job mix there was no increase in incentives to invest in human capital. De Young (1985) found that manufacturing industries in rural areas have no positive impact on educational performance and sometimes their impact is adverse.

A 1977 study of high school dropouts in a three-county area of Missouri, showed that students do respond to the local labor market. Fifty-four percent of the dropouts perceived that they would have no difficulty finding jobs and

that better jobs would be hard to find even with a high school diploma (University of Missouri 1977). This suggests that students' expectations of the returns to a high school education were not enough of an incentive to keep them in school. After dropping out, 64% felt they needed more education and 59% regretted dropping out. When given the opportunity, some dropouts did obtain a high school equivalency certificate. The additional information they gathered after dropping out changed their expectations of the returns to education and some made the decision to increase their investment by obtaining a high school equivalency certificate.

Given the empirical evidence, Smith (1988a) suggests that selective recruitment of industries with larger components of trained manpower, even if they create fewer jobs, is a major leverage point for dealing with the chronic problem of deficient education that limits individual economic progress. The Missouri findings also suggest that it is possible to inform young people about the additional options available to them if they obtain a high school diploma.

Models of Human Capital Investment and Labor Demand

A search of the literature revealed few models measuring the impact of local labor market structure on human capital investment. However, models estimated for other purposes also are pertinent.

Kraybill et al. (1987) examined the impact of resource dependence, a measure of community economic structure, on quality of life in rural Virginia. A major hypothesis of the study was, "[w]hen the variability of income is high, the risk in investment both in physical and human capital is high....Consequently, lower levels of investment are expected,...with possible adverse impacts on the quality of life of the residents of the area" (Kraybill, et al. 1987).

Several of the quality of life dependent variables used in the study are also indicators of human capital investment: percent of the population over age twenty-five with a college education, dropout rates, and scores on reading, math and language skills. As expected, income instability decreased human capital investment in resource dependent counties (although the impact was not always statistically significant). Per capita income increased human capital investment in all counties. (Once again the impact was not always statistically significant.) The incidence of poverty decreased investment in human capital in non-resource dependent counties, but its results were mixed in resource dependent counties. Dependence on natural resources, an indicator of the economic structure of the area, decreased investment in human capital, compared with non-resource dependent counties.

De Young (1985) used stepwise regression to select the local economic variables with the most predictive power for individual and community investment in human capital in Kentucky counties. Individual investment was measured as the percent of tenth graders with below average reading skills and the percent of ninth graders who graduated from high school. Independent variables measuring county economic structure included: total farm income, total manufacturing income, total mining income, total income, per capita income, unemployment rate, average persons per household, and location in or outside Appalachia. Similar to the findings by Kraybill, et al., mining

income is negatively related to individual investments in human capital while per capita income is positively related to these investments. Location in Appalachia negatively affected graduation rates. Contrary to expectations, total county income also negatively affected graduation rates. Farming income increased the percent of below average readers as did the number of persons per household.

Hobbs (personal communication, June 22, 1990) specified a preliminary model with the dropout rate of each state in 1988 as a dependent variable. The independent variables include the percent of children in poverty (1979), expenditures per student (1988), percent of adults with a high school education (1980), per capita income (1987) and the change in total employment from 1980 to 1987. A statistically significant positive relationship between the change in employment and the dropout rate supports the hypothesis that labor market structure affects human capital investment. An alternative way of interpreting the results is that as the demand for labor increases in a state, employers become more willing to accept workers with lower skills, increasing the incentive for students to drop out of school and take those jobs.

Thus, there is some support for the hypothesis that local economic structure affects investment in human capital. However, the specific hypothesis by Smith that the ratios of high skilled to low skilled jobs influence human capital investment has not been tested.

Model of Human Capital Investment in Virginia

To test the hypothesis that local labor market structure, particularly the proportions of high and low paying occupations, affects human capital investment, we specified two models of human capital investment. Because of the availability of data, the two measures involve education although other human capital investment such as health, nutrition, vocational training or migration might also be used.

Following the finding by Killian and Parker (1991) that job growth in metropolitan areas during the 1980s was concentrated in areas with a high percentage of high school dropouts and in areas with a high percentage of college graduates, the dropout rate and the percent of graduates continuing their education were chosen as the dependent variables. High school dropout rates are a negative indicator of investment in human capital: the lower the dropout rate, the greater the investment in human capital. Dropout rates may be a fairly accurate indication of young people's perceptions or expectations of the returns to formal schooling, an important form of human capital investment. Dropout rates are measured as the annual percent of students who do not continue their high school education (Department of Education, 1981). The second measure of human capital investment is the percent of high school graduates continuing their education (Department of Education, 1981). This is a measure of how the returns to higher education are perceived by students.

Independent variables include the percentage of county employment in occupations classified as managerial and services (Center for Public Service, 1989), real per capita income (U.S. Department of Commerce, 1986), the unemployment rate (U.S. Department of Commerce, 1987), the percent change in population (U.S. Department of Commerce, 1972), and a measure of rurality

(Butler, 1990). The means and standard deviations of these variables are presented in Table 1. All rates are expressed in percentages and real per capita income is given in $100's of dollars. Data from Virginia's counties and independent cities are used to estimate the models. In Virginia, school districts coincide with county and city boundaries, causing less variation in educational opportunities within a county than in most other states. Because of data reporting conventions, several counties and cities were combined for the analysis.

Table 1: Means and Standard Deviations of Dependent and Independent Variables

Variable	Mean	Standard Deviation
DEPENDENT VARIABLES		
dropout rate	5.78	1.91
% continuing education	50.47	12.95
INDEPENDENT VARIABLES		
% managerial occupations	18.50	6.75
% service occupations	12.96	3.18
% unemployment	5.66	1.86
% population change 1970-1980	6.03	8.97
Real per capita income	94.82	
n = 129		

As hypothesized by Smith (1986b), individuals will be able to perceive returns to education in areas where there are high percentages of people with jobs who are rewarded for their education. If the majority of jobs available are low-paying and do not reward higher education, investment is expected to be lower. The percentage of occupations which are managerial is expected to positively influence investment as students will be able to see the returns to education. The percentage of local jobs that are services is expected to negatively affect human capital investment. The occupations included within each category are given in the appendix.

Real per capita income is expected to be positively related to investment in human capital because there will be less need for students to drop out of school to contribute to family income and because higher income families are likely to be receiving the returns to higher education. Also more educational opportunities are likely to be made available in the counties with higher incomes.

As unemployment rates increase, the likelihood of finding a job decreases, decreasing the opportunity costs of remaining in school. In addition, employers can become more selective in their hiring, further decreasing the likelihood of unskilled and inexperienced workers being hired. Thus, higher unemployment rates are expected to increase human capital investment. High local unemployment rates may also lead some individuals to consider the larger labor market and continue their education in order to compete in that market.

While the unemployment rate is specific to the county or city, population growth is a proxy for the economic vitality of the labor market area. Population growth rates reflect migration into or out of the area. Because commuting is possible, population growth also reflects the economic vitality of the labor market within commuting distance. Thus, population growth is expected to positively affect human capital investment.

To reflect the differential returns to education in rural and urban areas (McGranahan and Ghelfi forthcoming), a series of bivariate variables based on a non-metropolitan-metropolitan continuum are introduced. The codes categorize counties according to their proximity to metropolitan areas and population (Butler). The codes range from 0 to 9, with 9 as the most rural. Because of the low numbers of counties, categories 0 and 1 and 4 and 5 were grouped. Categories 4 and 5 are non-metropolitan counties with urban populations of 20,000 or more. Category 4 is adjacent to a metropolitan county and category 5 is not. Only one metropolitan county was classified as "0". This county was grouped with the next category metropolitan counties. The omitted category is the most urban.

As shown in Table 2, the percentage of total employment in managerial occupations substantially increases the percentage of high school students who continue their education, and decreases dropout rates. This supports the hypothesis that the local labor market creates incentives for human capital investment.

Dropout rates increase as the percentage of service occupations increase. Because service occupations tend to be low-skill, they are an option for dropouts. However, the percentage of personal service occupations has no impact on the percentage of students continuing their education. Personal services may have little influence on students who decide to continue their education because these students were most likely to graduate. The major impact of the local labor market on these students is in their decision of what to do after graduation.

In the equations, the impact of real per capita income on human capital investment is insignificant. Perhaps the occupation variables capture the income effects. Population growth decreases the dropout rate but has no impact on the percentage of students continuing their education.

As unemployment increases, the percentage of students who continue their education increases. However, unemployment rates have no impact on the dropout rate. If many dropouts are entering services this is plausible because this sector has continued to grow even when other sectors have suffered unemployment.

The impact of rural location on human capital investment is mixed. Contrary to expectations, counties in the two most rural categories have lower dropout rates than less rural and metropolitan counties. It may be that these counties have few job opportunities in general so that the opportunity cost of the student remaining in school is low. If there are few job opportunities, these counties may also have high out-migration. The student continues in school in response to a non-local labor market. While only the most rural counties have lower dropout rates, rural counties in general have a lower percentage of students who continue their education. In addition, one urban category also has a low percentage of students continuing their education.

Table 2: Influence of Demand for Labor on Human Capital Investment

Independent Variables 1980	Dependent Variables: Dropout Rate, 1980	Dependent Variables: Percent Continuing Education, 1980
Constant	5.82 (4.13)*	29.18 (3.46)*
% managerial occupations	-.08 (-1.85)*	.75 (2.78)*
% service occupations	.13 (2.34)*	-.10 (.32)
% unemployment	.07 (.61)	.87 (1.37)*
% population change 1970-1980	-.05 (-2.26)*	-.06 (-.47)
Real per capita income ($100's)	.00 (.11)	-.06 (.97)
Rural 2	.41 (.66)	-5.94 (-1.60)*
Rural 3	-.07 (.10)	-4.61 (-1.14)
Rural 45	-.77 (-1.13)	3.14 (.77)
Rural 6	.24 (.39)	-6.86 (-1.87)*
Rural 7	-.74 (-1.18)*	-6.85 (-1.84)*
Rural 8	-.91 (-1.38)*	-5.47 (-1.38)*
Rural 9	-1.08 (-1.55)*	-7.96 (-1.92)*
$\bar{R}^2$	.18	.35

Numbers in parenthesis are t-values

* Statistically significant at .10 or less

Policy Implications and Directions for Future Research

The models discussed above suggest that the types of jobs available in the local area do influence human capital investment as measured by education. Although Schultz's original discussion of human capital suggested that the demand for labor created incentives for human capital investment, this direction of causation had been ignored in research and in practice.

Instead the emphasis has been on the impact of the levels of local education on economic development and job growth. In practice this has translated into recruiting jobs based on the existing educational and skill levels in the community. While providing needed short-run jobs, this action also continues the existing labor market structure and does not increase the incentives for human capital investment.

Smith (1988a) suggests that a major point of leverage for the community is to actively recruit firms which have a higher percentage of workers who are rewarded for their education, even if these jobs are originally filled from outside the community. This strategy might also be complemented by recruiting educated former residents back into the community.

Smith (1988a) also suggests that firms with higher proportions of educated workers will be interested in improving local education opportunities. Communities may be reluctant to invest in education. If the most educated members of the community leave because they cannot find jobs, the community loses its return on the education investment it made in that person. On a personal level, families may develop an anti-education attitude to prevent the loss of family members.

If students can now remain in the community or return to the community after further education, the community will increase the return on its investment. An additional push from the firm to improve education may combine to break the community out of its steady state of low-wage jobs.

The study of dropouts in Missouri suggests people do respond to changes in their information about the labor market. This provides a further point of leverage for the community. Improving information to students about the labor market and the returns to education may increase the number of students who graduate. Job information combined with educational opportunities for those already in the labor market may also increase investment in human capital.

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Appendix

Rural-Urban Continuum Code

Code	
	Metro Counties:
0	Central counties of metro areas of 1 million population or more
1	Fringe counties of metro areas of 1 million population or more
2	Counties in metro areas of 250,000 to 1 million population
3	Counties in metro areas of fewer than 250,000 population
	Nonmetro counties:
4	Urban population of 20,000 or more, adjacent to a metro area
5	Urban population of 20,000 or more, not adjacent to a metro area
6	Urban population of 2,500 to 19,999, adjacent to a metro area
7	Urban population of 2,500 to 19,000, not adjacent to a metro area
8	Completely rural or fewer than 2,500 urban population, adjacent to a metro area
9	Completely rural or fewer than 2,500 urban population, not adjacent to a metro area

Source: Butler, Margaret A. "Rural-Urban Continuum Codes for Metro and Non-Metro Counties, ERS/USDA Staff Report No. 9028. April, 1990.

Occupations

Managerial and Professional Specialties

11	Officials and Administrators, Public Administration
12-13	Officials and Administrators, Other
14	Management Related Occupations
16	Engineers
17	Computer Scientists
18	Natural Scientists
19	Social Scientists and Urban Planners
20	Social, Recreation, and Religious Workers
22	Teachers; College, University and Other Post-Secondary Institution
23	Teachers, Except Post-Secondary Institution
24	Vocational and Educational Counselors
25	Librarians, Archivists, and Curators
26	Physicians and Dentists
27	Veterinarians
28	Other Health Diagnosing and Treating Practitioners
29	Registered Nurses
30	Pharmacists, Dietitians, Therapists, and Physician's Assistants
32	Writers, Artists, Performers, and Related Workers
33	Editors, Reporters, Public Relations Specialists, and Announcers
34	Athletes and Related Workers

Service Occupations

50	Private Household Occupations
51	Protective Service Occupations
52	Service Occupations, Except Private Household and Protective
91	Military Occupations

Source: U.S. Department of Commerce. "Standard Occupational Classification Manual." United States Government Printing Office, 1980.